

WHAT IS CLAIMED IS

1. A substrate processing apparatus for processing a substrate with a processing liquid fed to the substrate,
5 comprising:

a holding member for holding the substrate; and

a lower side member which is movable relatively with respect to an undersurface of the substrate held by the holding member between a processing position near the undersurface of the substrate and a retreat position remote from the undersurface of the substrate,

the processing liquid being fed to a space between an upper surface of the lower side member moved to the processing position and the undersurface of the substrate held by the holding member
15 to process the undersurface of the substrate.

2. The substrate processing apparatus according to claim 1, wherein the holding member is rotatable.

3. The substrate processing apparatus according to claim 1, wherein the lower side member is movable to a processing liquid scattering position, in addition to the processing position and the retreat position, where a step of rotating the substrate to scatter away the processing liquid is performed.

4. The substrate processing apparatus according to claim 1, wherein the lower side member includes a lower side temperature adjusting mechanism for adjusting a temperature of the processing liquid.

5. The substrate processing apparatus according to claim 4, wherein the lower side temperature adjusting mechanism includes a temperature adjusting path which is provided inside the lower side member and through which a fluid having a temperature adjusted
35 flows.

6. The substrate processing apparatus according to claim

1, wherein the processing liquid is fed also to an upper surface of the substrate held by the holding member, and the upper surface of the substrate is processed.

5 7. The substrate processing apparatus according to claim 1, further comprising an upper side member which can be moved relatively with respect to an upper surface of the substrate held by the holding member to be near the upper surface of the substrate.

10 8. The substrate processing apparatus according to claim 7, further comprising a liquid temperature adjusting mechanism for adjusting a temperature of the processing liquid to be fed to the upper surface of the substrate.

15 9. The substrate processing apparatus according to claim 7, wherein the upper side member includes an upper side temperature adjusting mechanism for adjusting the processing liquid to be fed to the upper surface of the substrate.

20 10. A substrate processing apparatus for processing a substrate with a processing liquid fed to the substrate, comprising:

 a holding member for holding the substrate in a substantially horizontal position;

25 a lower side member disposed in a substantially horizontal position below the substrate held by the holding member, an upper surface of the lower side member coming into contact with the processing liquid at a contact angle of not less than 50°; and

30 a first processing liquid feed path for feeding the processing liquid into a space between an undersurface of the substrate held by the holding member and the upper surface of the lower side member,

 a layer of the processing liquid being formed in the space between the undersurface of the substrate held by the holding member and the upper surface of the lower side member.

35

11. A substrate processing apparatus according to claim

10, wherein said lower side member is treated to have a hydrophobic property.

12. A substrate processing apparatus according to claim
5 10, further comprising:

a lift mechanism for moving the lower side member upward and downward so that a distance between the undersurface of the substrate held by the holding member and the upper surface of the lower side member can be altered.

10

13. A substrate processing apparatus according to claim
10, wherein a surface of the holding member, which comes into contact with the substrate, has a wettability such that, when in contact with the processing liquid, a contact angle of not
15 less than 50°.

14. A substrate processing apparatus according to claim
10, further comprising:

a rotating mechanism for rotating the holding member; and
20 a second processing liquid feed path for feeding the processing liquid to an upper surface of the substrate held by the holding member,

a puddle of the processing liquid being formed on the upper surface of the substrate, and the substrate is processed with
25 the processing liquid.

15. A substrate processing apparatus according to claim
14, wherein the distance between the undersurface of the substrate and the upper surface of the lower side member is adjusted so
30 that the layer of the processing liquid and the puddle of the processing liquid are jointed together to cover up the entire surface including an edge surface of the substrate with the processing liquid.

16. A substrate processing apparatus according to claim
35 10, further comprising:

a rotation mechanism for rotating the holding member;

1005544-01233

an upper side member with an undersurface having wettability such that, when in contact with the processing liquid, a contact angle of not less than 50° being disposed so that the undersurface of the upper side member is opposite to the upper surface of the substrate held by the holding member; and

a second processing liquid feed path for feeding the processing liquid into a space between the upper surface of the substrate held by the holding member and the undersurface of the upper side member,

a layer of the processing liquid being also formed in the space between the upper surface of the substrate held by the holding member and the undersurface of the upper side member, and the substrate is processed with the processing liquid.

17. A substrate processing apparatus according to claim 14, wherein a distance between the upper surface of the substrate and the undersurface of the upper side member and a distance between the undersurface of the substrate and the upper surface of the lower side member are adjusted so that layers of the processing liquid formed on both the surfaces of the substrate are jointed together to cover up the entire surface including an edge surface of the substrate with the processing liquid.

18. A substrate processing apparatus according to claim 16, wherein the first processing liquid feed path comprises a first processing liquid discharge opening formed by piercing through the lower side member in thickness-wise direction at the substantial center of the lower side member; and a first processing liquid feed pipe disposed in communication with the first processing liquid discharge opening,

the second processing liquid feed path comprises a second processing liquid discharge opening formed by piercing through the upper side member in thickness-wise direction at the substantial center of the upper member; and a second processing liquid feed pipe disposed in communication with the second processing liquid discharge opening,

the processing liquid is fed to the space between the

undersurface of the substrate held by the holding member and the upper surface of the lower side member through the first processing liquid discharge opening, and the processing liquid is fed onto the upper surface of the substrate held by the holding member
5 through the second processing liquid discharge opening.

19. A substrate processing apparatus according to claim 16, wherein the upper side member is treated to have a hydrophobic property at least on its undersurface.

10

20. A substrate processing method for processing a substrate held by a holding member with a processing liquid fed to the substrate, comprising:

15 a first step of holding the substrate by the holding member;
a second step of moving the lower side member relatively with respect to the undersurface of the substrate held by the holding member from a retreat position which is remote from an undersurface of the substrate to a processing position which is near the undersurface of the substrate, and making the processing
20 liquid contiguous to the undersurface of the substrate held by the holding member to process the undersurface of the substrate;
a third step of drying the substrate;
a fourth step of unloading the substrate from the holding member.

25

21. The substrate processing method according to claim 20, wherein in making the processing liquid contiguous to the undersurface of the substrate and processing the undersurface of the substrate, the processing liquid is puddled between the
30 lower side member moved to the processing position and the undersurface of the substrate held by the holding member.

22. The substrate processing method according to claim 20, wherein in making the processing liquid contiguous to the
35 undersurface of the substrate and processing the undersurface of the substrate, the substrate is rotated relatively to the lower side member.

23. The substrate processing method according to claim 20,
wherein in making the processing liquid contiguous to the
undersurface of the substrate and processing the undersurface
5 of the substrate, the processing liquid is adjusted in temperature.

24. The substrate processing method according to claim 20,
comprising a step of feeding the processing liquid to the an upper
surface of the substrate and processing the upper surface of the
10 substrate.

25. The substrate processing method according to claim 24,
wherein the processing liquid is puddled on the upper surface
of the substrate.
15

26. The substrate processing method according to claim 24,
wherein in feeding the processing liquid to the upper surface
of the substrate and processing the upper surface of the substrate,
an upper side member is moved relatively with respect to the upper
20 surface of the substrate held by the holding member.

27. The substrate processing method according to claim 26,
wherein the upper side member does not contact the processing
liquid fed to the upper surface of the substrate.
25

28. A substrate processing method according to claim 20,
wherein the lower side member comes into contact with the processing
liquid at a contact angle of not less than 50° ;

the second step is a processing step of forming a layer
30 of processing liquid in a space between the undersurface of the
substrate and the upper surface of the lower side member,

and further comprising;

a fifth step of forming a puddle of the processing liquid
on an upper surface of the substrate held by the holding member.
35

29. A substrate processing method according to claim 28,
wherein the substrate, in the second step, is held still by the

holding member, the processing liquid is fed to both the upper surface and the undersurface of the substrate, feed of the processing liquid is stopped when the processing liquid is contiguous to the both the upper surface and the undersurface of the substrate, and the substrate is processed.

30. A substrate processing method according to claim 28, wherein the layer of the processing liquid and the puddle of the processing liquid formed in the second step and the fifth step are jointed together to cover up the entire surface including an edge surface of the substrate with the processing liquid, and both the upper surface and the undersurface of the substrate are processed.

31. A substrate processing method according to claim 30, wherein, after forming the layer of the processing liquid and the puddle of the processing liquid, the layer of the processing liquid and the puddle of the processing liquid are jointed together by rotating the substrate so that the layer of the processing liquid and the puddle of the processing liquid are extended beyond an edge portion of the substrate.

32. A substrate processing method according to claim 28, wherein an upper sidemember, whose undersurface comes into contact with the processing liquid at a contact angle of not less than 50° , is moved above the substrate relatively with respect to the upper surface of the substrate held by the holding member, the layer of the processing liquid and the puddle of the processing liquid formed in the second step and the fifth step are jointed together to cover up the entire surface including an edge surface of the substrate with the processing liquid, and both the upper surface and the undersurface of the substrate are processed.

33. A substrate processing method according to claim 28, further comprises a step of;

feeding the processing liquid to the upper surface of the substrate while an upper side member, whose undersurface comes

into contact with the processing liquid at a contact angle of not less than 50° , is moved above the substrate relatively with respect to the upper surface of the substrate held by the holding member, wherein

5 a space between the upper surface of the substrate held by the holding member and the undersurface of the upper side member is adjusted so that the puddle of the processing liquid formed in the fifth step become a layer of the processing liquid between
10 the upper surface of the substrate and the undersurface of the upper side member.

34. A substrate processing method according to claim 33, wherein the layer of the processing liquid and the puddle of the processing liquid formed in the second step and the fifth step
15 respectively are jointed together to cover up the entire surface including an edge surface of the substrate with the processing liquid, and both the upper surface and the undersurface of the substrate are processed.

20